Kennedy/Jenks Consultants

City of Upland
Urban Water Management Plan

28 December 2005

Prepared for

City of Upland
1370 North Benson Avenue
Upland, CA 91786

K/J Project No. 044401.00

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Section 1: Public Participation

1.1 Introduction

The Urban Water Management Plan 2005 prepared by the City of Upland (City) describes a balanced approach to the management of water supplies for the City. The UWMP provides guidance by describing and evaluating sources of water supply, efficient uses of water, demand management measures, implementation strategy and schedule and other information and programs. The UWMP will serve as a long-range planning tool to help the City assess their water resource needs. It is a solid basis for local and regional water management planning.

It is the City's objective to optimize the use of local groundwater and surface water supplies and reduce the City's reliance on imported water. As part of the City efforts to optimize the use of local surface water runoff, in1989 the City built a surface water treatment plant located on the south side of San Antonio Canyon Dam commonly referred to as the San Antonio Canyon Surface Water treatment Plant. This 6MDG plant captures and treats local surface water run-off from San Antonio Creek to meet the required drinking water standards, which is delivered to the City of Upland customers. In addition to this surface water treatment plant, the City is participating in a Dry Year Yield (DYY) groundwater storage program with Metropolitan Water District (MWD) wherein the City agrees to pump up to 3,001 acre-feet per year of local groundwater storage during dry years as requested by MWD. The City is nearing completion of an Ion-exchange groundwater treatment plant that will allow the City to produce and serve local Chino Basin groundwater for normal production and to meet DYY Program groundwater pumping obligations. This new groundwater treatment plant is scheduled for completion in March of 2006. In an effort to improve groundwater recharge, groundwater quality and enhance storm water flood protection, the City is pursuing the expansion of the Upland Basin, which is located in the upper northwest region of the Chino Groundwater Basin. The City has invested $16M to construct the Phase 1 Improvements, which increased the groundwater recharge capacity from 292 to 550 acre-feet of volume. At this time the City is pursuing funding to complete Phase 2 Improvements, which will complete the expansion of the basin to 1050 acre-feet. Infrastructure has been constructed to provide for the recharge of imported water into the Chino basin via the Upland Basin. All of these efforts are designed to improve local water supply resources, enhance groundwater quality and recharge, improve operational flexibility and optimize the use of local water resources consistent with the Chino Basin Optimum Basin Management Plan regional objectives.

Throughout the preparation of this plan, the City's water supplies and projected usage were analyzed and found to be sufficient for normal year, dry year and multiple dry year scenarios extending to the year 2025.

1.2 Urban Water Management Planning Act

The City's Urban Water Management Plan 2005 (Plan) has been prepared consistent with the State of California Water Code Sections10610 through 10656, known as the Urban Water Management Planning Act (Act).

Originally enacted in 1983, the Act requires that every urban water supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually prepare and adopt an urban water management plan. The Act requires urban water suppliers to prepare plans that describe and evaluate reasonable and practical efficient water uses, recycling and conservation activities. These plans must be filed with the California Department of Water Resources every five years. The deadline for filing the 2005 plan is December 31st of this year.

Since 1983, many amendments have been added to the Act, the most recent occurring in 2004. These amendments require additional actions addressing urban water management plan preparation and consideration of such issues as metering, drought contingency planning, and water recycling. A copy of the Urban Water Management Plan Act is included in Appendix A.

The Department of Water Resources (DWR) has provided detailed background information to guide water districts in developing the 2005 Urban Water Management Plans. Appendix B has a copy of DWR's check list for preparing a UWMP in compliance with the water code. Additional information can be found on DWR's web page (wwwd.water.ca.gov). The City followed the DWR guidelines and checklist in the development of this UWMP.

1.3 Agency Coordination

The City strives for community involvement, continuously educating customers on the need to conserve water by posting water conservation methods and tips in the Upland Today newsletter. The City's UWMP was last updated in December of 1985, and then developed jointly with IEUA thereafter. The City notified surrounding water agencies of the availability to review draft Urban Water Management Plan hosted on the City's Webb Site and on file at the City Clerk's Office and in the City Library. The City worked with Inland Empire Utilities Agency while developing their 2005 UWMP. The City noticed and held a public workshop on November 15, 2005 to present and receive public comment and the City also held a public hearing on November 28, 2005 to receive additional input for inclusion prior to adopting the 2005 Draft UWMP. The feedback was incorporated into the final plan, and the plan was adopted by the Board by on November 28, 2005. See Appendix C for approval resolution.

Section 2: Service Area

2.1 Demographic Factors

The City is located approximately 35 miles east of Los Angeles and lies directly south of the San Gabriel mountain range. The western boundary of the City generally coincides with the boundary line between San Bernardino and Los Angeles Counties. The northern boundary lies to the south of the San Antonio Heights residential community. The San Bernardino Freeway (Interstate 10) marks the southern boundary, and the Cucamonga Flood Channel generally coincides with the eastern boundary. The City has common boundaries with the incorporated Cities of Claremont on the west, Montclair to the southwest, Ontario to the south and Rancho Cucamonga on the east. The City consists of predominately residential neighborhoods with smaller portions of commercial and industrial developments.

2.1.1 Population

Table 1 displays the projected future population for the City. The population projection is based on 2000 census data. The City is currently 95% built-out, and it is anticipated the final 5% will occur over the next 10 years, with only minor increases thereafter.

Table 1: Population

Population - Current and Projected					
	2005	2010	2015	2020	2025
Service Area Population	71,850	73,600	73,700	73,800	73,900

2.1.2 Climate

The City receives average annual precipitation of 16.07 inches with average temperatures ranging from 52 degrees in the winter months to 79 degrees in the summer months. Records indicate that temperatures as high as 117 degrees have been recorded in the City. Table 2 gives an overview of the average evapotranspiration (ETo), rainfall, and temperature in the area. Information on ETo was gathered from the California Irrigation Management Information Systems website. Eto is the loss of water to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues). It is an indicator of how much water crops, lawn, garden, and trees need for healthy growth and productivity. Rainfall and temperature information was gathered from the Western Regional Climate Center, and is based on data gathered from 1927 to 2005.

Table 2: Climate

Climate													
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
Standard Average ETo, inches	2	2.28	3.34	4.62	4.99	6.04	6.98	6.97	5.27	3.96	2.65	2.06	51.25
Average Rainfall, inches	3.1	3.45	2.72	1.28	0.38	0.09	0.04	0.16	0.34	0.64	1.39	2.49	16.07
Average Temperature, °F	52.8	54.8	57.1	61.5	66.3	72	78.5	78.7	75	67.4	58.9	53.6	64.7

Section 3: Water Sources (Supply)

3.1 Overview of The City's Water Supplies

The City's current water supplies consist of three principal sources:

- Local groundwater pumped from City owned wells, and purchased local groundwater
- Surface water from San Antonio Water Company (SAWCo) and West End Consolidated Water Company (WECWCo)
- Imported MWD water.

During the 1990s, the City's average annual water sources consisted of 71% groundwater, 12% surface water, 16% imported water and 1% recycled water. Today, the City's water supply consists of approximately 69% groundwater, 21% imported water, and 10% local surface water. The City either directly owns or owns interest in water rights from local groundwater basins. According to the *Water Supply Assessment for the City of Upland Water Master Plan Update* (Geoscience, 2004), the City has an annual entitlement to approximately 46,782 acre-ft of ground water, local surface water, and imported water supplies. The City obtains its potable water from wells in the Cucamonga, Six and Chino groundwater basins. The largest source of water is from the Cucamonga Basin; a portion of which underlies northeastern Upland. Groundwater is supplied from the City's own wells and from the SAWCo and WECWCo wells. Surface water is supplied from the San Antonio Canyon Creek and imported from MWD through the WFA/JPA Water Treatment Plant. Local groundwater fulfills approximately 69% of the City's customers' water needs. The City realizes the need to maximize local resources and minimize the need to import water. Upgrades to the City's wells this year will add approximately 9,739 AFY to existing groundwater supplies. Table 3 lists the City's current and planned water supplies. This table quantifies wholesale water entitlements, supplier produced groundwater basin entitlements and average surface water supply.

Table 3: Current and Planned Water Entitlements

Current and Planned Water Supplies - AFY					
Water Supply Sources	2005	2010	2015	2020	2025
Wholesale Water Provider Entitlements (Includes all Basins)					
West End Consolidated Water Company	5,302	5,302	5,302	5,302	5,302
San Antonio Water Company	8,503	8,503	8,503	8,503	8,503
SPW from MWD of Southern California	20,870	20,870	20,870	20,870	20,870
City of Upland Groundwater Entitlement					
Cucamonga Basin	0	0	0	0	0
Chino Basin	4,688	4,688	4,688	4,688	4,688
Six Basins	2,183	2,183	2,183	2,183	2,183
Average Surface Water Supply					
San Antonio Tunnel Surface Water	1,428	1,428	1,428	1,428	1,428
San Antonio Canyon Surface Water	3,808	3,808	3,808	3,808	3,808
Total	**46,782**	**46,782**	**46,782**	**46,782**	**46,782**

The City utilizes an average of 20,061 acre-ft/yr of ground water, local surface water, and imported water. This annual water supply consists of approximately 69% ground water, 21% imported water, and 10% local surface water. The City has rights or entitlements to approximately 46,782 acre-ft/yr of ground water, local surface water, and imported water supplies. Presently, the City utilizes approximately 43% of its total entitlements. On average, the City utilizes:

- 66% of ground water rights (13,735 acre-ft/yr of 20,676 acre-ft/yr)
- 39% of surface water rights (2,065 acre-ft/yr of 5,236 acre-ft/yr), and
- 20% of imported water entitlements (4,261 acre-ft/yr of 20,870 acre-ft/yr).

In each of the ground water basins in which the City has ground water rights or entitlements, the City on average utilizes:

- 28% of Chino Basin ground water rights
- 70% of Six Basins ground water rights, and
- 110% of Cucamonga Basin ground water rights, through wholesale suppliers. This percentage includes supplemental entitlements.

Table 4 gives a summary of entitlements and utilization for groundwater, surface water (during a normal year) and imported water. Table 5 summarizes utilization by basin. Information on the values in Table 5 are given in the next section. All information was taken from the *Water Supply Assessment for the City of Upland Master Plan Update* (Geoscience, 2004).

Table 4: Entitlements and Utilization

Entitlements and Utilization				
	Entitlements AFY	Average % Utilization	Average AFY Utilized	% of Total Supply
Ground	20,676	66%	13,735.00	69%
Surface (normal year)	5,236	39%	2,065.00	10%
Imported	20,870	20%	4,261.00	21%
Totals	46,782	43%	20,061.00	100%

Table 5: Groundwater Utilization by Basin

Groundwater Entitlements and Utilization by Basin										
	Operating Safe Yield	Safe Yield or Pool	% Entitled	Entitled AFY	Average Supplemental AFY	Total AFY	Upland % Entitlement	Total Available AFY	Average Groundwater Utilized %	Average Annual Use AFY
Chino Basin	140,000	54,834								
The City			5.200%	2,852	1,836	4,688	100%	4,688	16%	2,198
SAWCo			2.748%	1,507	958	2,465	68%	1,676		
WECWCo			1.728%	948	606	1,554	91%	1,414		
Total				5,307				7,778		
Six Basins	19,300	18,000								
The City			9.544%	1,718	465	2,183	100%	2,183	33%	4,532
SAWCo			7.166%	1,290	349	1,639	68%	1,115		
WECWCo			15.399%	2,772	751	3,523	91%	3,205		
Total				5,780				6,503		
Cucamonga Basin	13,500	13,500								
SAWCo			48.150%	6,500	1,900	8,400	68%	5,712	51%	7,005
WECWCo			5.560%	750		750	91%	683		
Total				7,250				6,395		
							Total AFY:	20,676		13,735

Note: (a) Six Basins Safe Yield is based on 2003 Figures

3.2 Ground Water

The City's ground water production comes from wells located in three separate adjudicated basins: Chino Basin, Six Basins, and Cucamonga Basin. The City has ground water rights in the Chino Basin and Six Basins, and obtains ground water from the Cucamonga Basin through agreements with SAWCo and WECWCo. The City owns 68% of the stock in SAWCo and 91% of WECWCo stock, which entitles the City to water produced by those companies. Table 6 lists the City's groundwater pumping entitlements by basin. Tables 7 and 8 list the past amount of groundwater pumped and the future amount of groundwater pumped respectively.

Table 6: Ground Water Pumping Entitlements

Groundwater Pumping Rights - AFY	
Basin Name	**Pumping Right - AFY**
City of Upland	
Chino Basin	7,778
Six Basins	6,503
Cucamonga Basin	6,395
Total	20,676

Table 7: Amount of Groundwater Pumped by Upland

Amount of Groundwater pumped - AFY					
Basin Name(s)	**2000**	**2001**	**2002**	**2003**	**2004**
City of Upland – Chino & Six Basins	6227	6100	5048	5950	5590
WECWCo – Chino, Cucamonga, & Six Basins	2073	1493	1644	868	741
SAWCo	8475	5412	6505	5195	7213
% of Total Groundwater Supply Entitlement	81.1%	62.9%	63.8%	58.1%	65.5%

Table 8: Amount of Groundwater Projected to be Pumped by Upland

Amount of Groundwater projected to be pumped - AFY				
Basin Name(s)	**2010**	**2015**	**2020**	**2025**
City of Upland – Chino & Six Basins	7153	9709	11554	12287
WECWCo – Chino, Cucamonga, & Six Basins	2000	2000	2000	2000
SAWCo	6300	6300	6300	6300
% of Total Groundwater Supply	74.7%	87.1%	96.0%	99.6%

3.2.1 Chino Basin

The City is located in the north-western most portion of the Chino Basin. Water rights in the Chino Basin were adjudicated in January 1978, and the Basin' s safe yield was established to be 140,000 acre-ft per year. See Appendix D for the Chino Basin Judgment. Safe yield is defined in the Chino Basin Judgment as "the long-term average annual quantity of ground water (excluding replenishment of stored water but including return flow to the Basin from use of replenishment or stored water) which can be produced from the Basin under a particular year without causing an undesirable result." The 1978 Judgment's allocation of the safe yield of the Basin includes three separate water zones: the Overlying Agricultural, Overlying Non-Agricultural, and the Appropriative Pool. The City is part of the Appropriative Pool and has rights to 5.202% of the safe yield (defined as 54,834 acre-ft/yr), or 2,852.4 acre-ft/yr.

The SAWCo and WECWCo also have rights in the Chino Basin, amounting to 1,506.9 acre-ft (2.748% of safe yield) and 947.7 acre-ft (1.728% of safe yield), respectively. The City is entitled to 68% and 91% of water produced by SAWCo and WECWCo, respectively.

In addition to the operating safe yield (OSY) allocated to the members of the Appropriative Pool, the Chino Basin Watermaster reallocates the unused portion of the safe yield allocated to the Overlying Agricultural Pool to members of the Appropriative Pool as a supplement to their OSY rights in any year. For fiscal years 1989-90 through 2001-02, the average annual reallocation of agricultural pool safe yield has been a total of 3,400 acre-ft/yr for the City of Upland, SAWCo, and WECWCo

Additionally, members of the Appropriative Pool who have converted land uses from irrigated agriculture may be entitled to additional unallocated safe yield water from the Overlying Agricultural Pool. In cases of land use conversion, the Watermaster determines the allocable percentages for each appropriator based on converted acreage.

3.2.2 Six Basins

The Six Basins adjudicated ground water basin is located west of the San Jose Fault at the western side of the City and consists of Canyon Basin, Upper Claremont Heights Basin, Lower Claremont Heights Basin, Pomona Basin, Live Oak Basin, and Ganesha Basin. The Six Basins operate under a court judgment that went into effect on January 1, 1999. Appendix E contains the Six Basins Judgment. In accordance with that settlement, the City is entitled to produce

9.544% of the basin' s operating safe yield (OSY), SAWCo is entitled to 7.166%, and WECWCo is entitled to 15.399%. The total OSY at the time of the judgment was 19,300 acre-ft, corresponding to initial production rights of 1,842 acre-ft/yr for the City of Upland, 2,972 acre-ft/yr for WECWCo, and 1,383 acre-ft/yr for SAWCo. The Six Basins Watermaster determined the OSY for calendar year 2003 to be 18,000 acre-ft.

The operating safe yield is estimated to be 16,500 acre-ft for calendar year 2004, and16,000 acre-ft/yr in 2005 and 2006; therefore, the allocation to each party would be lower than in 2003 and previous years (Upland, 2005). The Six Basins Judgment defines OSY as "the amount of groundwater, in acre-ft, which the Watermaster shall determine can be produced from the Four Basins Area by the parties during any single year, free of any replacement obligation under the Physical Solution." The Four Basins include Lower and Upper Claremont Basins, Pomona Basin, and Canyon Basin. The City is entitled to purchase 68% and 91% of water produced by SAWCo and WECWCo, respectively. The Watermaster determines operating safe yield using a hydrologic balance calculation, taking into consideration water level elevations, recharge activities, extraction, water quality data, precipitation data, and the probable availability of imported water.

3.2.3 Cucamonga Basin

The City does not pump directly from Cucamonga Basin, but receives water from the Basin through SAWCo and WECWCo. Cucamonga Basin is located east and north of the Red Hill Fault in the northeastern section of the City. In 1958, a stipulated judgment allocated ground water within the Cucamonga Basin to 24 stipulating parties, which today consist of WECWCo, SAWCo, and Cucamonga Valley Water District (CVWD). See Appendix F for a copy of the Cucamonga Basin Judgment. The judgment stipulates SAWCo' s water production as 6,500 acre-ft/yr, and requires that SAWCo spread an average of 2,000 acre-ft/yr of imported water from San Antonio Canyon Creek within Cucamonga Basin. Over ten years, 95% of surplus spread water can be added to SAWCo's right to extract 6,500 acre-ft. On average, SAWCo has historically spread 4,000 acre-ft annually, corresponding to an average additional 1,900 acre-ft/yr ground water production right. WECWCo has a right to 750 acre-ft/yr production from Cucamonga Basin.

3.3 Surface Water

The City itself, does not collect surface water, however, the City receives surface water through it's rights with SAWCo. SAWCo has rights to direct surface water from San Antonio Canyon Creek and San Antonio Canyon Tunnel. The annual amount of water available from San Antonio Canyon Creek has varied from 271 acre-ft to 11,000 acre-ft, and has averaged 5,600 acre-ft. Annual average flow in the deep rock tunnel has ranged from 10 to 6,500 acre-ft, and has averaged 2,100 acre-ft.

The City owns and operates the 6 million gallon per day (mgd) San Antonio Canyon Surface Water Treatment plant located at the base of San Antonio Dam. Surface water that is treated and produced from the treatment plant is purchased from SAWCo, in which the City owns stock. The City has a 68% entitlement to SAWCo water, corresponding to 5,236 acre-ft/yr of surface water supplies.

3.4 Imported Water

The City also receives treated State Project Water (SPW) from the Metropolitan Water District of Southern California (MWD) via the Water Facilities Authority/Joint Powers Authority (WFA/JPA) Water Treatment Plant (WTP), Agua de Lejos. The City owns 23% of the Agua de Lejos WTP, which entitles the City to approximately 18.6 million gallons per day of treated imported water, or 20,870 acre-ft/yr.

Section 4: Reliability of Supply

Reliability of supply is affected by many factors. The following paragraphs give an analysis of factors affecting the City's groundwater, surface water and imported water. Recycled water use and alternative sources of supply are also discussed.

4.1 Factors Resulting in Inconsistency of Groundwater Supply

According to municipal water production and transfer data, the City produces an average of 13,735 acre-ft of ground water a year from the three major ground water basins, representing approximately 69% of the City's total water supply (Table 4). City well production data from 2000 to 2003 indicates that 51% of the City's ground water supply came from wells located in the Cucamonga Basin, 33% came from the Six Basins, and 16% came from the Chino Basin (Table 5). The average annual production by basin corresponds to 28% utilization of City water rights within the Chino Basin, 70% utilization within the Six Basins, and 110% utilization within the Cucamonga Basin.

4.1.1 Quality

Ground water quality problems in the Chino Basin prevent the City from producing its full entitlement. In the southwest area of the City, Well Numbers 3, 8, 13, and 21A exceed Maximum Contaminant Levels (MCLs) for nitrate and dibromochloropropane (DBCP). The City is currently constructing and Ion-Exchanged and DBCP Water Treatment Plant, which will restore water production from City Well Numbers 3, 8 and 21A, which are currently non-operational. This 2,600gpm Ion-Exchange Water Treatment plant is part of a Dry Year Yield Program with MWD to optimize the use local water supplies especially during extending drought periods when imported water supply may be restricted.

In the southeastern Chino Basin well area, Well No. 9 exceeds the MCL for tetrachloroethylene (PCE) and nitrate. This well is downstream from the Sanitary Landfill, which operated from 1950 to 1979 as an unlined municipal solid waste disposal site and released organic and inorganic compounds to ground water (Upland, 2005).

In general, average historical nitrate concentrations are lowest in City wells located nearest to sources of surface water spreading, such as at San Antonio Dam, along San Antonio Creek, or at the Cucamonga Spreading Grounds. Nitrate exceedances are limited to wells located in the southeastern and southwestern areas of the City. Average historical Total Dissolved Solids (TDS) concentrations are below the Secondary MCL of 500 mg/L in all City wells. Highest average TDS concentrations generally occur in wells with higher nitrate concentrations.

4.1.2 Well Production

The recent yields of City wells range from approximately 600 gpm (Well No. 2) to 1,500 gpm (Well No. 15). The production characteristics of Chino Basin wells in the southern part of the City are better than in wells drilled in the northernmost part of Chino Basin. Recently measured specific capacities are higher in the southwestern area of the City, and range from 27 to 44

gpm/ft. In comparison, the specific capacity of the only active city production well in the northern part of chino Basin, Well 20, was recently measured at 5.5 gpm/ft. In 1988 two wells (Wells 18 and 19) were drilled and abandoned without installing permanent pumps in the northernmost part of Chino Basin within the City. These wells were drilled to approximately 1,000 ft depth, yet did not achieve discharge rates greater than 50 gpm.

4.2 Surface Water

The availability of local surface water supplies is highly dependent on local precipitation, and is substantially less in dry years. Between 1990 and 2003, annual surface water supply ranged from a low of 202 acre-ft in 1990 to a high of 4,297 acre-ft in 1995.

4.3 Imported State Water Project Water

Metropolitan Water District of Southern California (MWD) provides imported water from Northern California and the Colorado River to 27 member agencies, including the Inland Empire Utilities Agency (IEUA), which serves the City. MWD has reported that sufficient supplies will be available to meet demands through 2030 (IEUA, 2005). To ensure reliability, MWD supports projects to increase supplies and improve water quality.

The Agua de Lejos Water Treatment Plant (WTP) is permitted to treat and deliver 81 mgd of State Project Water. The Chino Basin Optimum Basin Management Plan (OBMP) identifies the WFA/JPA Agua de Lejos WTP as a reliable source of low-TDS water. According to the OBMP, the WTP is expandable to 88 mgd, and is a reliable supplemental source of water for water purveyors in the western Chino Basin.

4.4 Recycled Water

Recycled water from the Upland Hills Water Reclamation Plant (WRP) represents approximately 1% of the City's water supply. Inland Empire Utilities Agency (IEUA) indicates that upsizing tertiary filters would allow for increased flow. However, site constraints and adjacent land uses limit the potential for plant expansion.

4.5 Alternative Source of Supply

Rehabilitation of Upland Basin in southwestern Upland (south of the College Heights Spreading Basins) has been proposed by Inland Empire Utilities Agency (IEUA) as a project to increase ground water recharge within the Chino Basin, consistent with the Optimum Basin Management Plan (OBMP). The proposed project would integrate Upland Basin into the Chino Basin Regional Recycled Water Recharge (RRWR) System as a ground water replenishment or storage facility. Upland Basin would be used as a percolation basin for recycled water, State Project Water, and storm water captured from the local mountain watersheds. Water from these three sources would be blended to achieve the TDS and other goals of the OBMP. The anticipated recharge is 8,250 acre-ft/yr (Upland, 2005), although this amount would depend upon storm water flows, the availability of State Project Water, and the availability of recycled water from IEUA.

Section 5: Water Use

5.1 Past Current and Projected Water Use

The City projects water use to rise at a gradual rate over the next twenty years. The ultimate demand includes water for the Southwest Area Proposed Development Projects. Tables 9 and 10 list projected deliveries and use for the City through the year 2025.

Table 9: Past, Current and Projected Water Deliveries

Past, Current and Projected Water Deliveries						
	2000	2005	2010	2015	2020	2025
Water Use Sectors	AFY	AFY	AFY	AFY	AFY	AFY
Commercial	4,062	4,062	4,403	4,744	5,085	5,426
Residential	16,280	15,523	16,826	18,129	19,433	20,736
Other	2,428	2,388	2,588	2,789	2,989	3,190
Total	22,770	21,973	23,818	25,662	27,507	29,352

Table 10: Total Water Use

Total Water Use - AF Year						
Water Use Year	2000	2005	2010	2015	2020	2025
Total Water Use	22,770	21,973	23,818	25,662	27,507	29,352

5.2 Future Water Supply Projects

The City is currently re-piping three of its wells as part of an ion-exchange treatment plant project. The rehabilitation of these three wells will produce and extra 2,539 AFY of water to the City. The construction of three new wells is also taking place. These three wells will each produce 1,200 AFY supplying the City with an additional 3,600 AFY of water.

Table 11: Future Water Supply Projects

Future Water Supply Projects			
Project Name	Projected Start Date	Projected Completion Date	Normal-year AF
New Well #1	2004	2007	1200
New Well #2	2004	2007	1200
New Well #3	2004	2007	1200
Ion Exchange Rehab Well #3	2004	2006	622
Ion Exchange Rehab Well #8	2004	2006	717
Ion Exchange Rehab Well #21a	2004	2006	1200

5.3 Water Quality Impacts

Ground water quality problems in the Chino Basin prevent the City from producing its full entitlement. In the southwest area of the City, wells exceed Maximum Contaminant Levels (MCLs) for nitrate and dibromochloropropane (DBCP).

In the southeastern Upland Chino Basin well area, the City's well exceeds the MCL for tetrachloroethylene (PCE) and nitrate. This well is downstream from the Upland Sanitary Landfill, which operated from 1950 to 1979 as an unlined municipal solid waste disposal site and released organic and inorganic compounds to ground water (Upland, 2005).

In general, average historical nitrate concentrations are lowest in City wells located nearest to sources of surface water spreading, such as at San Antonio Dam, along San Antonio Creek, or at the Cucamonga Spreading Grounds. Nitrate exceedances are limited to wells located in the southeastern and southwestern areas of the City. Average historical Total Dissolved Solids (TDS) concentrations are below the Secondary MCL of 500 mg/L in all City wells. Highest average TDS concentrations generally occur in wells with higher nitrate concentrations.

Section 6: Wholesale Water Supplies

6.1 Wholesale Suppliers

The City projects the following demands for water provided by wholesale suppliers:

Table 12: Agency Demand Projections Provided to Wholesale Suppliers

Agency Demand Projections Provided to Wholesale Suppliers - AFY				
Wholesaler	2010	2015	2020	2025
Imported Water (Metropolitan)	6,300	5,588	5,588	6,700

6.1.1 Metropolitan Water District

The City receives treated State Project Water (SPW) from the Metropolitan Water District of Southern California (MWD) via the Water Facilities Authority/Joint Powers Authority (WFA/JPA) Water Treatment Plant (WTP), Agua de Lejos. The City owns 23% of the Agua de Lejos WTP, which entitles the City to approximately 18.6 million gallons per day of treated imported water, or 20, 870 acre-ft/yr.

MWD is a wholesale water agency that serves supplemental imported water from Northern California SWP and the Colorado River to 27 member agencies located in portions of Los Angeles, Orange, Riverside, San Bernardino, San Diego and Ventura Counties. Nearly 90% of the populations within these counties, about 18 million people, reside within MWD's 5,200 square mile service area. The draft MWD UWMP provides detailed documentation of MWD facilities and imported water deliveries.

Since 1983 the total regional retail water demands within MWD's service area have increased from about 3.0 million acre-feet to 4.1 million acre-feet in 2004. MWD currently provides an average of 50% of the municipal, industrial, and agricultural water used within its boundaries. The remaining 50% comes from local wells, local surface water, recycled water supplies, and from the City of Los Angeles' aqueduct in the eastern Sierra Nevada. Over the past decade supplies from the Colorado River have averaged 1.2 million acre feet. Supplies from the State Water Project over the same period have averaged 700,000 acre-feet of water. The future reliability of these supplies is increasingly uncertain. One of MWD's primary goals is to develop additional reliability through the California Aqueduct by purchasing out-of-region storage for SWP water and SWP water transfers.

Detailed information on MWD's service reliability, planned sources of water supply, and supply reliability during multiple dry years can be found in Appendix G.

Section 7: Recycled Water

7.1 Wastewater

The City's wastewater is treated at a regional treatment plant operated by Inland Empire Utilities Agency (IEUA). The flow is directed to Regional Treatment Plant No. 1, in the City of Ontario. Regional Treatment Plant No. 1 began operation in 1948 through a joint powers agreement between the cities of Ontario and Upland. IEUA, then known as Chino Basin Municipal Water District, purchased RP-1 in January 1973. Several major expansions have been completed bringing the facility to its current capacity of 44mgd. RP-1 serves all or part of the cities of Ontario, Rancho Cucamonga, Upland, Montclair, Fontana and unincorporated areas of San Bernardino County.

7.2 Recycled Water

IEUA recently took over the operation of the Upland Hills Water Reclamation Plant (WRP) from the City. The 0.2mgd capacity plant is located off Campus Avenue at 17th Street, at the northwest corner of Upland Hills Country Club Golf Course. The WRP skims flow from the trunk sewer in Campus Avenue and serves Title 22 water to the Upland Hills County club, returning sludge back to the sewer to be treated at IEUA's RP-1 wastewater treatment facility in the City of Ontario. IEUA's 2002 Water Facilities Master Plan indicated that upsizing tertiary filters would allow for increased flow. However, site constraints and adjacent land uses limit the potential for plant expansion.

The City is currently working with IEUA and will be receiving recycled water provided through IEUA recycled water program. IEUA is a current provider of recycled water to customers in the Chino and Chino Hills areas. IEUA first began planning for a regional recycled water delivery system to provide recycled water throughout its service area in the 1990's. IEUA continued to plan by doing a Regional Recycled Water Program Feasibility Study that was completed in January of 2002. The Feasibility Study identified facilities to deliver over 70,000 acre-feet of recycled water per year to customers and recharge sites throughout the IEUA service area. In 2004 IEUA initiated development of a Regional Recycled Water Program Implementation Plan, which would update the information collected for the 2002 report and further define the required infrastructure to deliver recycled water. A Recycled Water Implementation Plan (RWIP) was completed in 2005. The plan identifies a phased implementation over the next the years.

Section 8: Demand Management Measures

The City is a member of the California Urban Water Conservation Council. Appendix H contains their current BMP Activity Reports. The City has made a good faith effort to implement each of the 14 BMP's and their BMP Activity Reports contain a record of implementation activities.

Section 9: Water Shortage Contingency Plan

9.1 Water Supply Shortages

The City's four stage rationing plan is invoked during declared water shortages. The plan includes voluntary and mandatory rationing, depending on the causes, severity, and anticipated duration of the water supply shortage. Different actions are taken at each stage and all decisions are the opinion of the City Council. The authority of the City Council is codified.

Table 13: Water Supply Shortage Stages and Conditions

Water Supply Shortage Stages and Conditions		
Stage No.	**Water Supply Conditions**	**% Shortage**
Year Round	When the demand for water consumption exceeds the City's available supply, or threatens to do, provided there are no resources available to remedy the situation.	At the Opinion of the City Council
Moderate Shortage	When the demand for water consumption exceeds the City's available supply, or threatens to do, provided there are no resources available to remedy the situation.	At the Opinion of the City Council
High Shortage	When the demand for water consumption exceeds the City's available supply, or threatens to do, provided there are no resources available to remedy the situation.	At the Opinion of the City Council
Severe Shortage	When the demand for water consumption exceeds the City's available supply, or threatens to do, provided there are no resources available to remedy the situation.	At the Opinion of the City Council

Automatic emergency generators will power critical pumps and facilities in the event of a power outage. In the event of an earthquake, damage will be evaluated and responses will be made accordingly.

Table 14: Preparation Actions for a Catastrophe

Preparation Actions for a Catastrophe	
Possible Catastrophe	**Summary of Actions**
Regional power outage	Automatic emergency generators power critical pumps and facilities.
Earthquake	Evaluate damage and respond accordingly.

9.2 Estimated Minimum Water Supply

The three year estimated minimum water supply quantifies the minimum water supply available during the next three years based on the driest three-year historic sequence for the City. The driest three-year historic sequence is 1990-1992 as referenced in section 10, table 19. Table 15 reflects the minimum amount of water available. The City has entitlement and access to additional groundwater, not reflected in this table, to meet customer demands.

Table 15: Three – Year Estimated Minimum Water Supply

Three-Year Estimated Minimum Water Supply - AFY				
Source	**Normal**	**Year 1 (2006)**	**Year 2 (2007)**	**Year 3 (2008)**
Ground Water	13,735	16,736	16,736	16,736
Surface Water	2,065	1,755	1,032	826
Imported Water	4,261	1,260	1,260	1,260
Total	20,061	19,751	19,028	18,822

9.3 Prohibitions and Consumption Reduction

The City has prohibitions and consumption reduction methods set up for four water shortage stages. The stages consist of the Year Round Stage, seen below in Table 16, the moderate shortage stage, the high shortage stage and the severe shortage stage. Information pertaining to specific prohibitions and reduction methods for each of the four stages can be found in the Mandatory Prohibitions and Consumption Reduction Methods Ordinance 1786, Appendix I. Penalties and charges will be enforced in accordance with the stipulations in Table 17.

Table 16: Mandatory Prohibitions and Consumption Reduction Methods

Mandatory Prohibitions and Consumption Reduction Methods
Conservation Program, Ordinance No. 1786, Section 7732.00 - Year Round Stage
The washing of sidewalks, walkways, driveways, public and private parking areas and all other impervious hard surfaced areas by direct hosing when runoff water directly flows to a gutter or storm drain, except as may be necessary to properly dispose of flammable or other dangerous liquids or substances, wash away spills that present a trip and fall hazard, or to prevent or eliminate materials dangerous to the public health and safety: Excessive or unreasonable run off of water or unreasonable spray of the areas being watered. Every customer is deemed to have his/her water system under control at all times, to know the manner and extent of this water use and any run off, and to employ available alternatives to apply irrigation water in a reasonably efficient manner.
Allowing, permitting or causing the escape of water through breaks or leaks within the customers plumbing or private water distribution system for any substantial period of time within which such break or leak should reasonably have been discovered and corrected. It shall be presumed that a period of seventy-two (72) hours after the customer discovers such a break or leak or receives notice from the City of a break or leak, is a reasonable time within which to correct such break or leak, or, at a minimum, to stop the flow of water from such break or leak.
Outdoor irrigation of landscape by sprinklers during the hours of 10:00 a.m. to 6:00 p.m. Citizens are encouraged to avoid the use of sprinklers on windy days. Irrigation by hand held hose, drip irrigation, hand held bucket, or similar container or by use of a cleaning machine equipped to recycle any water used are permitted anytime. In no event shall any water so used be permitted to run off into adjacent property, streets, alleys or storm drains.
Washing of automobiles, trucks, trailers, boats, airplanes, and other types of equipment (mobile or otherwise) unless done with a hand held bucket or hand held hose equipped with a positive shutoff nozzle for quick rinses. The nozzle shall be removed when the hose is not in use to ensure the water supply is shutoff. However, this section does not apply to the washing of the above-listed vehicles or mobile equipment when conducted on the immediate premises of a commercial car-wash.
All eating and drinking establishments of any kind including, but not limited to, any restaurant, hotel, cafe, cafeteria, bar or club, whether public or private, shall not provide drinking water to any person unless expressly requested.
Exceptions: None of these restrictions shall apply to the following: The routine and necessary use of water, other than for landscape irrigation, by a governmental entity in pursuit of its governmental functions for the benefit of the public, such as construction projects and for the cleaning of streets to prevent debris and harmful substances from entering water systems via storm drains. The necessary use of water for the routine maintenance and/or repair of water distribution facilities, residential and commercial plumbing and permanently installed landscaped irrigation systems.

Table 17: Penalties and Charges

Penalties and Charges
Penalties or Charges
No customer of the City of Upland or person who uses water within the City of Upland shall knowingly use, or permit the use of water in a manner contrary to any provision of this part, or in an amount in excess of that use permitted by the provisions of this chapter or that is reasonably necessary to satisfy the water usage need.
Unless otherwise provided, any person, firm or corporation violating any provision of said Chapter 7 as adopted by reference above, other than the provisions of section 7737 through 7740 of City ordinance 1786, shall be guilty of an infraction or misdemeanor as hereinafter specified at the City's discretion, and each day or portion thereof such violation is in existence shall be a new and separate offense.
Guilty of an infraction offense and punished by a fine of not less than twenty-five dollars ($25.00) but not exceeding fifty dollars ($50.00) for a first violation during any calendar year or declared conservation stage, whichever time period is shorter in duration.
Guilty of an infraction offense and punished by a fine not less than fifty dollars ($50.00) and not exceeding one hundred dollars ($100.00) for a second violation during any calendar year or declared conservation stage, whichever time period is shorter in duration.
On conviction of a third violation, guilty of a misdemeanor offense and shall be punished by a fine not less than five hundred dollars ($500.00) nor more than one thousand dollars ($1,000.00) during any calendar year or declared conservation stage, whichever time period is shorter in duration.
Notwithstanding the above, first or second offense may be charged and prosecuted as a misdemeanor at the City's sole discretion. In addition to the above penalties, such convicted person, firm, corporation or other entity may, in the discretion of the court, be ordered to reimburse the City for all necessary costs incurred through investigation, discovery, analysis, inspection, abatement and other actual costs incurred by the City or its agents pertaining to the violation.
The court shall fix the amount of any such reimbursements upon submission of proof of such costs by the City. Payment of any penalty herein provided shall not relieve a person, firm or corporation, or other entity from the responsibility of correcting the condition resulting from the violation.
In addition to the above, the water utility director is hereby empowered to enact other penalties and restrictive measures that are intended to abate the conductor circumstances comprising the violation, including but not limited to the following: placement of a flow restricting device upon the water service, locking off of water meter, removal of water meter, and shutting off of the service line valve.

Section 10: Reliability Planning

10.1 Reliability During a Drought

The available supplies and water demands for the City's service area were analyzed to assess ability to satisfy demands during three scenarios: a normal water year, single dry year, and multiple dry years. The tables in this section present the supply-demand balance for the various drought scenarios for the twenty year planning period 2005-2025. It is expected that the City will be able to meet 100 percent of its dry year demand under every scenario. Table 18 presents the supply reliability for the City's service area during normal, single dry, and multiple dry water years.

Table 18: Supply Reliability

Supply Reliability - AFY					
			Multiple Dry Water Years		
	Normal Water Year	Single Dry Year	Year 1	Year 2	Year 3
Groundwater	13,735	16,736	16,736	16,736	16,736
Imported Water	4,261	1,260	1,260	1,260	1,260
Surface Water	2,065	1,755	1,755	1,032	826
Total	20,061	19,751	19,751	19,028	18,822
% of Normal Year	100%	98%	98%	95%	94%

The historical basis for the supply reliability data is presented in Table 19, which summarizes the base years for normal water, single dry, and multiple dry water years.

Table 19: Basis of Water Year Data

Basis of Water Year Data		
Water Year Type	Base Year(s)	Historical Sequence
Average Water Year	FY 2004	1922-2004
Single-Dry Water Year	1977	
Multiple-Dry Water Years	1990-1992	

The following subsections describe the region's water supply and demand during each of the three scenarios for the next twenty years.

10.1.1 Normal Water Year

The City's water supply is broken down into three categories: groundwater, imported water, and surface water. The Supply Reliability described previously and summarized in Table 18 predicts that 100 percent of local supplies will be available to meet the City's demands during a normal water year. The following Table 20 presents the projected entitlements during a normal year and compares these entitlements to the projected normal year demand. The city has entitlement to approximately two times the amount of projected use.

Table 20: Projected Normal Water Supply Entitlements

Projected Normal Water Supply Entitlements - AF Year				
	2010	**2015**	**2020**	**2025**
Groundwater Supply Entitlement	20,676	20,676	20,676	20,676
% of projected total supply entitlement	44%	44%	44%	44%
Surface Water Supply Avg. Entitlement	5,236	5,236	5,236	5,236
% of projected total supply entitlement	11%	11%	11%	11%
Imported Water Supply Entitlement	20,870	20,870	20,870	20,870
% of projected total supply entitlement	45%	45%	45%	45%
Total	46,782	46,782	46,782	46,782

Table 21 summarizes the region's demands during a normal year over the next twenty years. It is estimated that water demands will increase only slightly over the next twenty years. The City is 95% built out and the population is projected to increase minimally.

Table 21: Projected Normal Water Demand

Projected Normal Water Demand - AF Year				
	2010	**2015**	**2020**	**2025**
Demand	23,818	25,662	27,507	29,352
% of year 2005	108%	117%	125%	134%

The comparison between supply and demand for a normal water year is presented in Table 22. In a normal year, zero water conservation has been assumed, providing a more conservative assessment of the region's supplies. The region is expected to meet 100 percent of water demands through the year 2025.

Table 22: Projected Supply Entitlement and Demand Comparison

Projected Supply Entitlement and Demand Comparison - AF Year				
	2010	2015	2020	2025
Supply Entitlement Totals	46782	46782	46782	46782
Demand totals	23818	25662	27507	29352
Difference	22965	21120	19275	17430
Difference as % of Supply Entitlement	49%	45%	41%	37%
Difference as % of Demand	96%	82%	70%	59%

10.1.2 Single Dry Year

The water demands and supplies for the City's service area over the next twenty years were analyzed in the event that a single dry year occurs, similar to the drought that occurred in California in 1977. The following paragraphs describe the effect of a single dry year on each of the City's water sources. The projected single water year supply is based on the projected amount of water to be used from each source, not on the total entitlement of each source. A 10% water conservation reduction was taken for the single dry year demand.

Groundwater. Groundwater supplies represent a significant primary source of water for water agencies in the area. The majority of regional groundwater is produced from the Chino Basin with additional water produced from other local groundwater basins. The Chino Basin is the largest groundwater basin in the Upper Santa Ana Watershed, currently containing 5,000,000 AF of water in storage with an unused storage capacity of approximately 1,000,000 AF. Water rights within the Chino Basin have been adjudicated and the average safe yield of the Basin is 140,000 AFY. It is anticipated that when over-pumping is required during a single dry year event, additional groundwater pumped beyond the safe yield of the Basin will be replenished during wet or normal years with imported water purchased from the Metropolitan Water District of Southern California (MWD) and with supplemental water from recycled and/or surface supplies.

IEUA, the Chino Basin Watermaster (Watermaster), and MWD have developed the Chino Basin Dry-Year Yield Program (DYY Program) to help alleviate demands on imported water during dry years by pumping additional groundwater. Three Valleys Municipal Water District is also a signatory to the Program. The DYY Program is the first step in a phased plan to develop and implement a comprehensive conjunctive use program to allow maximum use of imported water available during wet years and stored groundwater in the Chino Basin during dry years. Imported water deliveries to participants would increase during wet or normal (or "put") years, and purchase of imported water would decrease during dry (or "take") years. Collectively, the eight DYY participants, six of which are local retail agencies of IEUA, would meet predetermined amounts to achieve a 25,000 AFY "put" and a 33,000 AFY "take". Each of the local retail agencies volunteered to produce excess groundwater during a dry year in-lieu of normal imported water deliveries. In exchange, they received funding for new groundwater treatment and well facilities that would allow excess groundwater production during dry years. The City's

overall imported water demands during dry years would decrease by 3,001 AFY, which is their portion of the 33,000 AFY of the DYY shift obligation for IEUA's local retail agencies.

Surface Water. The City is entitled to San Antonio Tunnel Surface Water and San Antonio Canyon Surface Water. Currently, the City receives approximately 6,500 AFY of surface water, which is expected to hold constant through 2025. During a dry year, however, it is anticipated that the availability of surface supplies will decrease. For a single dry year event, surface supplies are assumed to have 85 percent reliability, which is estimated based upon historical rainfall data in the Prado region during the years 1970-2003. Water Year 2001-2002 was the driest on record with 5.08 inches of precipitation.

Imported Water. Southern California expects to have a reliable water supply for the foreseeable future due to the integrated resources planning effort of the Metropolitan Water District of Southern California (MWD) and its member agencies. As a water wholesaler, MWD supplies imported water to IEUA to meet the water needs of its service area at the lowest possible cost. MWD's Report on Metropolitan's Water Supplies, dated March 25, 2003, describes how MWD has created a diverse resource portfolio and aggressive conservation program to protect the reliability of the entire system. MWD demonstrates that sufficient supplies can be reasonably relied upon to meet projected supplemental demands. The report outlines MWD's Comprehensive Supplemental Supply Plan, which if implemented, would provide MWD with the capability to reliably meet projected supplemental water demands through 2030. As a result, during a single dry year event, MWD will have the resources to supply IEUA with all of their imported water demands. However, as discussed previously, with the DYY Program in effect, several of IEUA's retail agencies, including Upland, will reduce their imported water demand by their DYY Program shift, thus reducing demands on Metropolitan. In accordance with the DYY Program, the City must produce and extra 3,001 AFY of groundwater in order to reduce their imported demand by 3,001 AFY.

Tables 23 to 25 summarize the projected single dry year water supply and demand for the years 2010 through 2025.

Table 23: Projected Single Dry Year Water Supply

Projected single dry year Water Supply - AF Year				
	2010	**2015**	**2020**	**2025**
Groundwater Supply	16,382	18,754	20,414	20,963
% of projected normal entitlement	35%	40%	44%	45%
Surface Water Supply	1,755	1,755	1,755	1,755
% of projected normal entitlement	4%	4%	4%	4%
Imported Water Supply	3,299	2,587	2,587	3,699
% of projected normal entitlement	7%	6%	6%	8%
Total	21,436	23,096	24,756	26,417

Table 24: Projected Single Dry Year Water Demand

Projected single dry year Water Demand - AF Year				
	2010	2015	2020	2025
Demand	21,436	23,096	24,756	26,417
% of projected normal demand	90.0%	90.0%	90.0%	90.0%

Table 25: Projected Single Dry Year Supply and Demand Comparison

Projected single dry year Supply and Demand Comparison - AF Year				
	2010	2015	2020	2025
Supply totals	21,436	23,096	24,756	26,417
Demand totals	21,436	23,096	24,756	26,417
Difference	0	0	0	0
Difference as % of Supply	0.0%	0.0%	0.0%	0.0%
Difference as % of Demand	0.0%	0.0%	0.0%	0.0%

10.1.3 Multiple Dry Years

The Water demands for the City's service area over the next twenty years were analyzed in the event that a multiple dry year period occurs, similar to the drought that occurred in the years 1990-1992. The following paragraphs summarize the effects of a multiple dry year scenario on the City's water supplies. The projected supply reflects actual projected usage, not entitlement. Demands were projected over the 20 year period and a 10% water conservation decrease was applied of all dry years.

Groundwater. Similar to the Single Dry Year scenario described previously implementing the DYY Program requires local retail agencies to produce additional groundwater in-lieu of accepting imported water deliveries. Each agency pumps additional groundwater in the amount of their shift obligation. The City is obligated to pump an extra 3, 001 AFY during the dry year scenario. Production in excess of the safe yield of the Basin is replaced with replenishment water during wet or normal years. With the DYY Program in place, groundwater has been assumed to be available during dry years.

Recycled Water. During multiple dry years, the use of recycled water for irrigation and other purposes helps reduce overall water demands. It had been assumed that during multiple dry years, recycled water will be 100% reliable.

Surface Water. Though surface water provides a supplemental source of water for the City during normal years, the volume of available surface water is expected to decrease in a multiple dry year scenario. Surface water reliability was estimated using rainfall data for the Prado

region during the years 1970-2003. This decrease in available supplies can be offset by implementation of a conservation program during dry years or through pumping of additional groundwater. Surface water reliability is anticipated to be in the range of 30 to 50 percent during a multiple year drought.

Imported Water. During multiple dry years, local agencies reduce their imported water demands by increasing groundwater production in accordance with the DYY Program. The DYY Program reduces imported water demands by approximately 40 percent, thereby conserving Metropolitan's supplies during a drought.

Tables 26 to 37 show the water supply available to the City during a multiple dry year period for the years 2010 to 2025.

10.1.3.1 Multiple Dry year Period 2010

Table 26: Projected Supply During Multiple Dry Year Period Ending in 2010

Projected supply during multiple dry year period ending in 2010 - AFY					
	(normal)	(single dry)	(multiple dry)	(multiple dry)	(multiple dry)
	2006	**2007**	**2008**	**2009**	2010
Groundwater Supply	16,016	17,425	18,480	19,018	19,536
% of projected normal entitlement	34%	37%	40%	41%	42%
Surface Water Supply	2,065	1,755	1,032	826	640
% of projected normal entitlement	4%	4%	2%	2%	1%
Imported Water Supply	4,261	1,260	1,260	1,260	1,260
% of projected normal entitlement	9%	3%	3%	3%	3%
Total	22,342	20,440	20,772	21,104	21,436

Table 27: Projected Demand Multiple Dry Year Period Ending in 2010

Projected demand multiple dry year period ending in 2010 - AFY					
	2006	**2007**	**2008**	**2009**	**2010**
Demand	22,342	20,440	20,772	21,104	21,436
% of projected normal	100.0%	90.0%	90.0%	90.0%	90.0%

Table 28: Projected Supply and Demand Comparison During Multiple Dry Year Period Ending 2010

Projected Supply and Demand Comparison during multiple dry year period ending in 2010- AFY					
	2006	**2007**	**2008**	**2009**	**2010**
Supply totals	22,342	20,440	20,772	21,104	21,436
Demand totals	22,342	20,440	20,772	21,104	21,436
Difference	0	0	0	0	0
Difference as % of Supply	0%	0%	0%	0%	0%
Difference as % of Demand	0%	0%	0%	0%	0%

10.1.3.2 Multiple Dry Year Period 2015

Table 29: Projected Supply During Multiple Dry Year Period Ending in 2015

Projected supply during multiple dry year period ending in 2015 - AFY					
	(normal)	(single dry)	(multiple dry)	(multiple dry)	(multiple dry)
	2011	**2012**	**2013**	**2014**	2015
Groundwater Supply	15,821	17,046	18,101	18,639	19,157
% of projected normal entitlement	34%	36%	39%	40%	41%
Surface Water Supply	2,065	1,755	1,032	826	640
% of projected normal entitlement	4%	4%	2%	2%	1%
Imported Water Supply	6,300	3,299	3,299	3,299	3,299
% of projected normal entitlement	13%	7%	7%	7%	7%
Total	24,186	22,100	22,432	22,764	23,096

Table 30: Projected Demand Multiple Dry Year Period Ending in 2015

Projected demand multiple dry year period ending in 2015 - AFY					
	2011	**2012**	**2013**	**2014**	**2015**
Demand	24,186	22,100	22,432	22,764	23,096
% of projected normal	100.0%	90.0%	90.0%	90.0%	90.0%

Table 31: Projected Supply and Demand Comparison During Multiple Dry Year Period Ending 2015

Projected Supply and Demand Comparison during multiple dry year period ending in 2015- AFY					
	2011	**2012**	**2013**	**2014**	**2015**
Supply totals	24,186	22,100	22,432	22,764	23,096
Demand totals	24,186	22,100	22,432	22,764	23,096
Difference	0	0	0	0	0
Difference as % of Supply	0%	0%	0%	0%	0%
Difference as % of Demand	0%	0%	0%	0%	0%

10.1.3.3 Multiple Dry Year Period 2020

Table 32: Projected Supply During Multiple Dry Year Period Ending in 2020

Projected supply during multiple dry year period ending in 2020 - AFY					
	(normal)	(single dry)	(multiple dry)	(multiple dry)	(multiple dry)
	2016	**2017**	**2018**	**2019**	2020
Groundwater Supply	18,378	19,418	20,473	21,011	21,529
% of projected normal entitlement	39%	42%	44%	45%	46%
Surface Water Supply	2,065	1,755	1,032	826	640
% of projected normal entitlement	4%	4%	2%	2%	1%
Imported Water Supply	5,588	2,587	2,587	2,587	2,587
% of projected normal entitlement	12%	6%	6%	6%	6%
Total	26,031	23,760	24,092	24,424	24,756

Table 33: Projected Demand Multiple Dry Year Period Ending in 2020

Projected demand multiple dry year period ending in 2020 - AFY					
	2016	**2017**	**2018**	**2019**	**2020**
Demand	26,031	23,760	24,092	24,424	24,756
% of projected normal	100.0%	90.0%	90.0%	90.0%	90.0%

Table 34: Projected Supply and Demand Comparison During Multiple Dry Year Period Ending 2020

Projected Supply and Demand Comparison during multiple dry year period ending in 2020- AFY					
	2016	**2017**	**2018**	**2019**	**2020**
Supply totals	26,031	23,760	24,092	24,424	24,756
Demand totals	26,031	23,760	24,092	24,424	24,756
Difference	0	0	0	0	0
Difference as % of Supply	0%	0%	0%	0%	0%
Difference as % of Demand	0%	0%	0%	0%	0%

10.1.3.4 Multiple Dry Year Period 2025

Table 35: Projected Supply During Multiple Dry Year Period Ending in 2025

Projected supply during multiple dry year period ending in 2025 - AFY					
	(normal)	(single dry)	(multiple dry)	(multiple dry)	(multiple dry)
	2021	**2022**	**2023**	**2024**	**2025**
Groundwater Supply	19,111	19,966	21,021	21,560	22,078
% of projected normal entitlement	41%	43%	45%	46%	47%
Surface Water Supply	2,065	1,755	1,032	826	640
% of projected normal entitlement	4%	4%	2%	2%	1%
Imported Water Supply	6,700	3,699	3,699	3,699	3,699
% of projected normal entitlement	14%	8%	8%	8%	8%
Total	27,876	25,420	25,752	26,085	26,417

Table 36: Projected Demand Multiple Dry Year Period Ending in 2025

Projected demand multiple dry year period ending in 2025 - AFY					
	2021	**2022**	**2023**	**2024**	**2025**
Demand	27,876	25,420	25,752	26,085	26,417
% of projected normal	100.0%	90.0%	90.0%	90.0%	90.0%

Table 37: Projected Supply and Demand Comparison During Multiple Dry Year Period Ending 2025

Projected Supply and Demand Comparison during multiple dry year period ending in 2025- AFY					
	2021	**2022**	**2023**	**2024**	**2025**
Supply totals	27,876	25,420	25,752	26,085	26,417
Demand totals	27,876	25,420	25,752	26,085	26,417
Difference	0	0	0	0	0
Difference as % of Supply	0%	0%	0%	0%	0%
Difference as % of Demand	0%	0%	0%	0%	0%

10.2 References

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